APPENDIX G

SUBWATERSHED DESCRIPTIONS

ENGINEERING APPENDIX G
SUBWATERSHED DESCRIPTIONS

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1.0 Introduction

The following subwatershed descriptions are provided below for Ellis Creek, Bayhorse Creek, Morgan Creek, Challis Creek and Mill Creek, and Garden Creek (DEQ, 2001). The project is either located in the watershed, or the watershed directs its discharge into the project area. See plate 7 (see “Plates” in this report) for subbasin locations and figure 5-4 (see main report) for significant tributaries within the 12-mile reach.

2.0 Salmon River Corridor

The Salmon River corridor (303d listed for sediment and temperature). The Salmon River itself extends through a number of the subbasin's subwatersheds. The Salmon River is described as a large, powerful river capable of moving large amounts of sediment naturally produced by snowmelt runoff and thunderstorm events in its tributaries. Additionally, agricultural activities in its corridor and at the mouths of tributaries contribute additional sediment to the river (USFS, 1999b). The flood plain and banks have been modified considerably by conversion to cropland and by the construction of numerous dikes and diversions. Much of the natural sinuosity of the river has been reduced in an effort to protect residential and agricultural lands on either side. Recreation, especially river floating, is an increasing use of the river corridor. There are eight developed campgrounds in the corridor from the headwaters to Holman Creek, as well as several day-use areas and boat access facilities (BLM, 1998).

The Salmon River from the East Fork Salmon River to the Pahsimeroi River drops in elevation from 5,400 to 4,620 feet. Gradients are generally less than 4 percent, and channel types are a mix of Rosgen B-types through canyon areas and C-types in flatter, often agricultural areas (USFS, 1999b). Through this stretch, the river flows generally in a fairly narrow, rocky canyon except in the vicinity of the city of Challis where it opens up into a broad valley from 1 to 3 miles wide. North of Challis, the river re-enters a canyon configuration to the Pahsimeroi River. Mainstem baseflow is estimated to be around 1,000 cubic feet per second (cfs) (USFS, 1999b).

3.0 Ellis Creek (subbasin number 1706020101)

The Ellis Creek subwatershed includes Ellis Creek and Spring Gulch on the west side of the Salmon River just south of the town of Ellis, and a number of small drainages on the east side of the Salmon River including Shotgun Creek, Sheep Creek, Dry Gulch, and Pennal Gulch. Very little information is available on these streams. They are likely to be small, intermittent, and some are probably dewatered by agricultural diversions. Ellis Creek is likely a perennial stream due to the size of its watershed.

4.0 Bayhorse Creek (subbasin number 1706020104)

The Bayhorse Creek subwatershed is a large section that includes Bayhorse Creek and a number of smaller face drainages to the Salmon River between Garden Creek and the East Fork Salmon River. Some of the smaller drainages included are Birch Creek, Rattlesnake Creek, and Lyon Creek on the west side of the Salmon River, and Malm Gulch and Bradshaw Gulch on the east side of the Salmon River.

The west side watersheds including Bayhorse Creek, Birch Creek, Rattlesnake Creek, and Lyon Creek total about 41,607 acres in size and includes only one perennial stream (Bayhorse Creek) (USFS, 1999b). Elevations on the west side range from 10,072 feet on Bald Mountain to about 5,200 feet. Bayhorse Creek originates in Bayhorse Lake and flows downstream with gradients from 8 percent to almost 20 percent. The lowest reach near the mouth has gradients around 3 to 4 percent. Birch Creek, Rattlesnake Creek, and Lyon Creek have gradients generally around 10 percent. Bayhorse Creek flow varies from 1 cfs to over 70 cfs. Stream banks are stable and generally well shaded (USFS, 1999b). Water temperatures are consistently low and remarkably stable (between 9 and 14 degree Celsius from July 1 to September 30, 1997) (USFS, 1999b). Other fish habitat parameters are generally in excellent condition. Bayhorse Creek is known to support steelhead.

The Bayhorse Creek watershed has a history of mining activity including Skylark Mine, Ramshorn Mine, Pacific Mine, and Riverview Mine among others. No mines are currently active and no reclamation has occurred. The possibility of heavy metal leaching exists (USFS, 1999b). There are three water rights claims totaling 8.5 cfs on private land (USFS, 1999b). These rights include the entire summer flows of Bayhorse Creek. Other uses in the watershed include grazing, recreation (including Bayhorse Lake Campground), residential, and agricultural. Logging occurred in the valley bottoms aggressively until the late 1950s (USFS, 1999b).

5.0 Morgan Creek (subbasin number 1706020131)

The Morgan Creek subwatershed is the northern most subwatershed in the subbasin. Morgan Creek enters the Salmon River from the north side about half way between Challis and the Pahsimeroi River. The subwatershed includes 77,305 acres of land under Federal and private ownership (USFS, 1999b). Portions of valley floors are in private irrigated agricultural use. Morgan Creek is a typical central Idaho mountain stream dominated by a snowmelt runoff flow regime. Average annual flow is 35.6 cfs with peak flow equal to 278 cfs and low flow to 6.2 cfs (USFS, 1999b). Approximately 60 percent of the annual flow occurs in May and June. Morgan Creek has a narrow riparian corridor heavily vegetated by cottonwoods and willows. Sediment in Morgan Creek varies from small, suspended sediment to cobble size bedload. Elevations range from 9,700 to 5,200 feet. According to the U.S. Forest Service (USFS) and U.S. Bureau of Land Management, every stream in the Morgan Creek subwatershed has some amount of bank erosion (USFS, 1999b). Bank stability ratings from 1995 to 1997 were generally above 80 percent for three out of four monitoring stations but were 50 to 64 percent at one station on Morgan Creek below Trail Creek. Trail Creek apparently suffered a "blow out" of some beaver dam, which has affected downstream reaches. Percent fines by depth were also measured at these sites in these years. Fines varied from 23 to 42 percent depending on year and location. Depth fines have decreased at three out of the four stations over the 3-year period.

The principle uses in the subwatershed are grazing, agriculture, and dispersed recreation. There have been small timber sales on USFS land. There are numerous unscreened diversions that have been in place since the late 1800s. Currently, there are 23 water rights claims for 49.01 cfs during March 15 through November 15 on Morgan Creek (USFS, 1999b). During the irrigation season, Morgan Creek is sometimes dewatered before it reaches the Salmon River. There is a large diversion above Corral Creek that dewaters a portion of Morgan Creek. Morgan Creek flow is recharged again by flow from Corral Creek.

6.0 Challis Creek and Mill Creek (subbasin number 1706020130 and 1706020129 - 303d listed for nutrients, sediment, flow alteration)

Challis Creek and Mill Creek subwatersheds are considered together here because streams in the Mill Creek subwatershed are tributaries to Challis Creek. Challis Creek originates in near vertical headwall cirque basins at elevations near 10,000 feet. The topography becomes more gently sloped benches and bottomlands at lower elevations. The hydrology is typical of central Idaho mountain streams with high flows in May and June from snowmelt runoff and low flows during winter months. Flows may increase temporarily due to local summer thunderstorms. Historic stream flow records show peak discharges varying from about 140 cfs to as high as 800 cfs (1965), although most years are below 250 cfs. Channels in the subwatersheds are relatively narrow and steep with gradients generally greater than 4 percent and some above 10 percent (USFS, 1997b). Stream gradients from the USFS boundary to Mosquito Flat Reservoir range from 4 to 5 percent (USFS, 1999b). Channel types are typically Rosgen A- and B-types, and there is little evidence of any downcutting, widening, or other degradations within the USFS lands. Annual flood stage was described as 160 cfs and annual yield was 40 cfs (USFS, 1997b).

Aquatic habitat was surveyed by the USFS in 1993 (USFS, 1997b). Tributaries to Challis Creek within the USFS boundaries were considered good to excellent quality. However, Challis Creek property immediately above the Forest boundary was identified as poor quality with elevated bedload sediment, poorly defined channels, and excessive erosion and sedimentation. Later in the same document (USFS, 1997b), the same stretch of Challis Creek was described as in fair to poor quality with braided channels, elevated suspended sediment, poorly oxygenated water, and unstable banks. It is not clear if these are observations or measurements.

Challis Creek watershed contains good populations of resident rainbow trout, cutthroat trout, whitefish, and sculpin (USFS, 1997b). Steelhead have also been found in the lower sections of Challis Creek, although no spawning and rearing areas occur above the USFS boundary. Brook trout, introduced in the 1950s, have established naturally reproducing populations in a variety of locations. Bull trout, once thought to be both fluvial and resident, are now restricted to small resident populations in headwater areas. Challis Creek was identified as critical habitat for chinook salmon, although no spawning or rearing salmon have been seen in the watershed for the last 20 years (USFS, 1997b).

The two subwatersheds total 75,150 acres and have 105 miles (0.89mi/mi2) of road and motorized trails (USFS, 1997b). The majority of the subwatersheds are in dense forest (65 percent) with sagebrush openings making up an additional 26 percent. Grazing and recreation are primary uses. There are two developed campgrounds at Mosquito Flat Reservoir and Mill Creek Campground, and a number of other primitive camping areas (USFS, 1999b). Below the USFS

boundary, most of the land surrounding Challis Creek is private and in agricultural uses. A dam creating Mosquito Flat Reservoir was built in 1950 for the purpose of irrigation water storage. This reservoir has been maintained as year-round storage since the 1970s. There are diversions for irrigation on all perennial streams in the Challis Creek and Mill Creek subwatersheds (USFS, 1997b). Challis Creek Lakes, Spruce Gulch, and West Fork Creek also have water storage structures to enhance irrigation (USFS, 1999b). According to the Idaho Department of Water Resources (IDWR) records, there are over 80 water rights for Challis Creek water, which are each less than 1 cfs flow.

7.0 Garden Creek (subbasin number 1706020128 - 303d listed for nutrients and sediment)

The Garden Creek subwatershed is a smaller watershed (approximately 50,000 acres in size) located directly above the city of Challis, Idaho. This subwatershed is often considered with Challis Creek because of their similarities of geology, soils, and hydrology (USFS, 1999b). Garden Creek, however, is relatively small and has no perennial tributaries. Stream gradients can vary from 5 percent to greater than 10 percent. Garden Creek flows directly into the city of Challis and is the municipal water supply for the city. The land area on both sides of Garden Creek below the Salmon-Challis National Forest (SCNF) boundary is entirely private. Much of this land is used for irrigated agriculture. There are approximately 46 water rights claims for Garden Creek water including the city's drinking water supply (IDWR resource records). Keystone Mine exists up Keystone Gulch just inside the SCNF boundary. The principle land use on SCNF land is grazing.